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VELOCICALC®
Air Velocity Meter

Model 9565 Series

Operation and Service Manual

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TSI 9565 VelociCalc Multi Function Ventilation Air Velocity Meter
TSI 9565-A 9565 A VelociCalc Multi Function Ventilation Air Meter
TSI 9565-P 9565 P VelociCalc Multi Function Ventilation Air Meter
TSI 9565-X 9565 X VelociCalc Multi Function Ventilation Air Meter

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Chapter 1

Unpacking and Parts Identification

Carefully unpack the instrument and accessories from the shipping container. Check the individual parts against the list of components below. If anything is missing or damaged, notify TSI immediately.

1. Carrying case
2. Instrument
3. Static pressure tip (9565-P model only)
4. Rubber tubing (9565-P model only)
5. USB cable
6. TRAKPRO CD-ROM with data analysis software
7. LogDat2 CD-ROM with downloading software
8. AC adapter

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Chapter 2

Setting-up

Supplying Power to the Model 9565 Series

The Model 9565 VELOCICALC® Air Velocity Meter can be powered in one of two ways: four size AA batteries or the AC adapter.

Installing the Batteries

Insert four AA batteries as indicated by the diagram located on the inside of the battery compartment. The Model 9565 is designed to operate with either alkaline or NiMH rechargeable batteries. Battery life will be shorter if NiMH batteries are used. If NiMH batteries are used the DIP switch will need to be changed. Refer to the next section, DIP Switch Settings. Carbon-zinc batteries are not recommended because of the danger of battery acid leakage.

DIP Switch Settings

To access the DIP switch, remove the batteries from the battery compartment. On the inside of the battery compartment, there is a window with a single DIP switch (see figure below). The table below shows the functions for the switch.

Caution: Make certain that power is turned off before changing the DIP switch settings.

Switch	Function	Settings
1	NiMH	OFF: Alkaline Batteries ON: NiMH Rechargeable Batteries

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Do **not** attempt to charge alkaline batteries.

Using the AC Adapter

The AC adapter can be used to power the instrument or to charge the NiMH batteries when the DIP switch in the battery compartment is set to NiMH. If the DIP switch is set to Alkaline, and the AC power adapter is connected, then the batteries will be bypassed and the meter will be powered by the AC adapter. Be sure to provide the correct voltage and frequency, which is marked on the back of the AC adapter.

AC Adapter input

Connecting Ventilation or IAQ Probes

The ventilation and IAQ probes have a "D" shape overmolding on the mini-DIN connector which must align with the connector at the base of the 9565 series meter. This will ensure the probe is properly connected and remains so during use. Once connected and turned on, refer to the DISPLAY SETUP for displaying the desired measurements.

"D" Shaped
mini-DIN connector

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Using the Telescoping Thermoanemometer Probes

The telescoping probe contains the velocity, temperature, and humidity sensors. When using the probe, make sure the sensor window is fully exposed and the orientation dimple is facing upstream.

NOTE: *For temperature and humidity measurements, make sure that at least 3 inches (7.5 cm) of the probe is in the flow to allow the temperature and humidity sensors to be in the air stream.*

Extending the Probe

To extend the probe, hold the handle in one hand while pulling on the probe tip with the other hand. Do ***not*** hold the cable while extending the probe as this prevents the robe from extending.

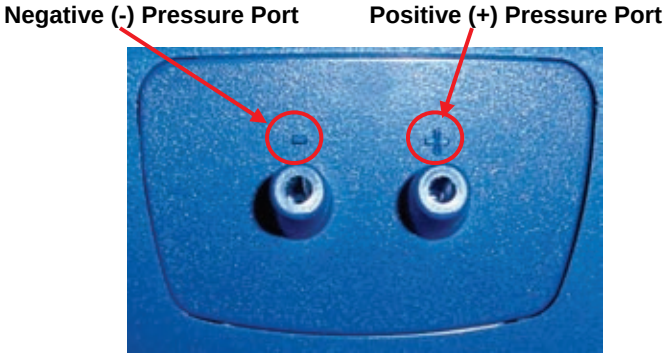
Retracting the Probe

To retract the probe, hold the handle in one hand while gently pulling the probe cable until the smallest antenna section is retracted.

Do **not** use the instrument or probes near hazardous voltage sources since serious injury could result.

Using the Pressure Ports (9565-P)

The 9565-P includes pressure ports that can be used to measure static and differential pressures in ductwork. For more information, see Application Note TSI-107.



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Connecting the Static Pressure Probe

The Static Pressure probe included with the 9565-P is connected to the + port on the 9565-P using the included tubing. The Static Pressure probe is used to measure the duct static pressure and features a magnet which holds the probe to the ductwork.

Connecting an Optional Pitot Probe or Airflow (straight pitot) Probe

When connected to a pitot probe, air velocity or air volume can be measured. A pitot probe can be connected to the "+" and "-" pressure ports on the Model 9565-P using two pieces of tubing of equal length. The total pressure port of the pitot probe connects to the "+" port on the meter, and the static pressure port of the pitot probe connects to the "-" port on the meter.

For information on how to perform a duct traverse, refer to Application Note TSI-106.

NOTE: *The pitot velocity needs a valid temperature to perform the standard or actual velocity correction. This is accomplished in the "Actual/Std Setup" menu. If no probe capable of measuring temperature (plug in probe or thermocouple) is connected, the"Temp Source" must be set to "Entered". The duct air temperature must then be manually inputted by the user using the "Entered Temp"setting. If the "Temp Source" is set to Probe or Thermocouple 1 or 2, and no probe is connected, dashes (------) will appear on the display.*

For more information on entering the temperature manually, refer to the Actual/Standard Setup section of this manual.

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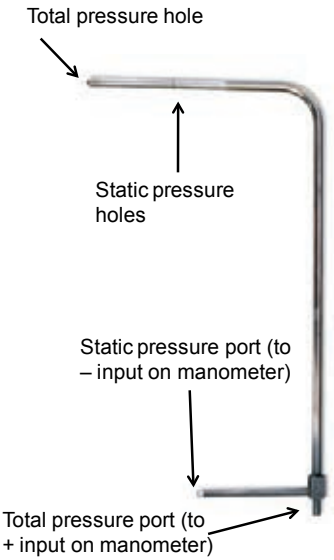
Total pressure hole
Static pressure holes
Static pressure port (to – input on manometer)
Total pressure port (to + input on manometer)

Do **not** use the instrument or probes near hazardous voltage sources since serious injury could result.

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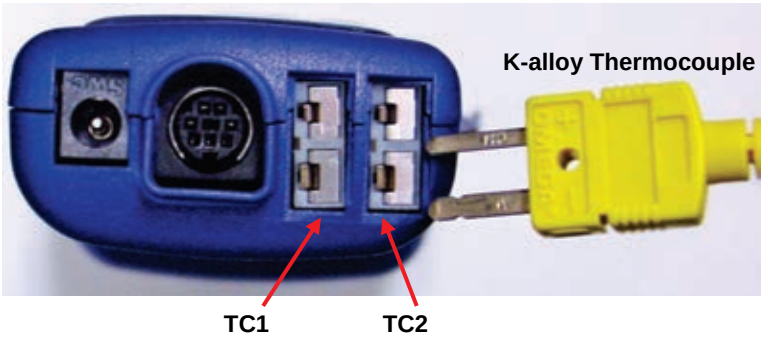
Thermocouple Ports

The 9565 series includes two thermocouple ports at the base of the meter. Any K-Alloy thermocouple with mini-connector can be attached. See Display Setup for setting the thermocouple temperature readings to be displayed as TC1, TC2, or TC1-TC2.

Connecting the Thermocouples

The K-Alloy thermocouple with mini-connector has one terminal wider than the other. The wider terminal will be inserted into the bottom of the TC1 or TC2 connector port.



Thermocouples from an alternate TSI supplier must have the metal sheath electrically isolated from the wires inside. Failure to meet this requirement may result in false readings, electrical shock, or fire hazard.

Do **not** use the instrument or probes near hazardous voltage sources since serious injury could result.

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Connecting the Optional Bluetooth® Portable Printer Device

To connect the Bluetooth printer to the Model 9565, power on the unit and the printer. Then press the **MENU** soft key. From the Menu use the ▲ and ▼ keys to highlight **Bluetooth Functions** and press the ↵ key. Highlight **Discover Devices** and press the ↵ key. If other TSI Bluetooth-printers are in the area, turn them off before searching. The Model 9565 will then search for and list all available Bluetooth devices.

For more information on establishing Bluetooth connections, refer to TSI Applications Note TSI-150.

Connecting to a Computer

Use the Computer Interface USB Cable provided with the Model 9565 to connect the instrument to a computer for downloading stored data or for remote polling. Connect the end labeled “COMPUTER” to the computer USB port and the other end to the data port of the Model 9565.

USB Communications Port

Caution: This symbol is used to indicate that the data port of the Model 9565 is **not** intended for connection to a public telecommunications network. Connect the USB data port only to another USB port on a safety certified computing device.

Protection provided by the instrument could be impaired if used in a manner other than specified in this user manual.

Bluetooth is a registered trademark of Bluetooth SIG.

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Chapter 3

Operation

Keypad Functions

ON/OFF ( ) Key	Press the **ON/OFF** key to turn the Model 9565 on and off. During the power up sequence the display will show the following: Model Number, Serial Number, and Software Revision. To turn the instrument off, press and ***hold*** the **ON/OFF** Key for 3 seconds. The instrument will count down (OFF2, OFF1, OFF). If AC Adapter is attached, the Battery and **ON/OFF** Key is bypassed. If the **ON/OFF** Key is pressed while the AC adapter is attached, the instrument instructs you to "Unplug the instrument to turn off unit". To turn the instrument on again, attach the AC adapter or press the **ON/OFF** Key.
Arrow (▲▼) Keys	Press to scroll through choices while setting a parameter. Pressing the ▲▼ keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments. To unlock the keypad, press the ▲▼ keys simultaneously.
Enter ( ) Key	Press to accept a menu selection, value or condition. Press to Start or Stop datalogging when in Continuous Key mode.

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Arrow (⮜or ⮞) and Menu Soft Keys	Press arrow keys to change choices while setting a parameter. Press the Menu soft key to select the Menu selections, which are Pressure Zero, Display Setup, Settings, Flow Setup, VOC Setup, Actual/Std Setup, Data Logging, Zero CO, Applications, Calibration, and Bluetooth Functions.

Common Terms

In this manual there are several terms that are used in different places. The following is a brief explanation of the meanings of those terms.

Sample	Consists of all of the measurement parameters stored at the same time.
Test ID	A group of samples. The statistics (average, minimum, maximum, and count) are calculated for each test ID. The maximum number of test IDs is 100.
Time Constant	The time constant is an averaging period. It is used to dampen the display. If you are experiencing fluctuating flows, a longer time constant will slow down those fluctuations. The display will update every second, but the displayed reading will be the average over the last time constant period. For example, if the time constant is 10 seconds, the display will update every second, but the displayed reading will be the average from the last 10 seconds. This is also referred to as a “moving average”.
Log Interval	The logging interval is the period over which the instrument will average the logged sample. For example, if the logging interval is set to 30 minutes, each sample will be the average over the previous 30 minutes.
Test Length	This is the time over which the data will be logged in the “Continuous-Time” mode of data logging.

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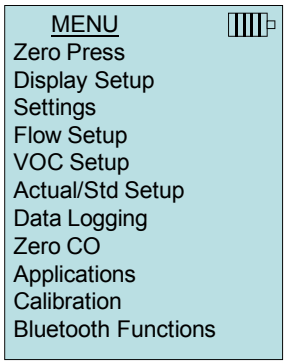
Menus

The menu structure is organized to allow easy navigation and instrument setup utilizing the arrow keys and ↵ button. To exit a menu or menu item, press the **ESC** key.

- To access the Menu items, press the **Menu** soft key.
- To select a parameter, use the Arrow keys to highlight the selection and press the ↵ button.



ZERO PRESSURE

To zero the pressure reading, leave the positive and negative ports open to atmosphere and select the **Zero Press**. The pressure sensor should be zeroed after initial setup and checked periodically. The instrument will indicate if the pressure zero was successful.

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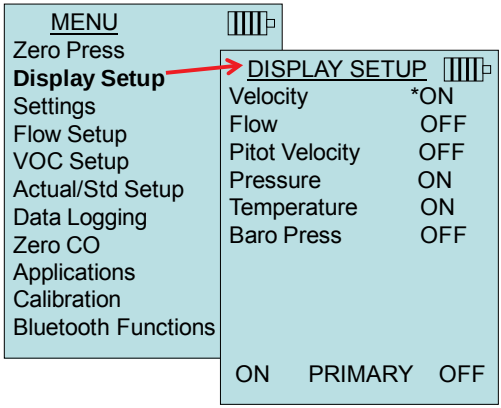
DISPLAY SETUP

Display Setup menu is where you will setup the desired parameters to be displayed on the instrument screen. With a parameter highlighted you can then use the **ON** soft key to have it show up on the instrument screen or select the **OFF** soft key to turn off the parameter. Use **PRIMARY** soft key to have a parameter show up on the instrument screen in a larger display. A total of 5 parameters can be shown on the display, 1 primary (large font) and 4 secondary. Parameters shown in the Display Setup screen are dependent on the type of probe currently connected.

- When set to **PRIMARY**, measurement will be the large font on the display.
- When set to **ON**, measurement will be displayed as a secondary parameter (up to 4 can be displayed).
- When set to **OFF**, measurement will not be displayed.



NOTE: *Pitot Velocity and AFProbe Velocity cannot both be ON at the same time, nor can one be set to* ***PRIMARY*** *and the other to ON. Only one can be ON at any given time.*

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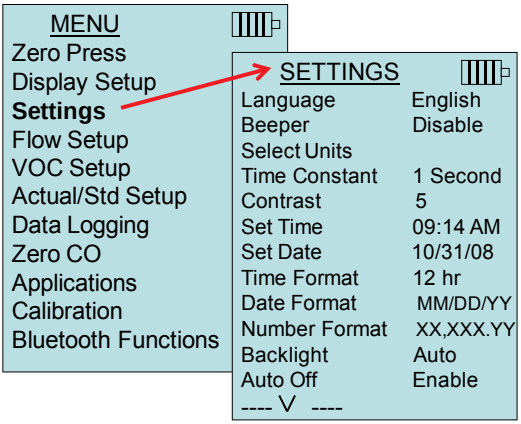
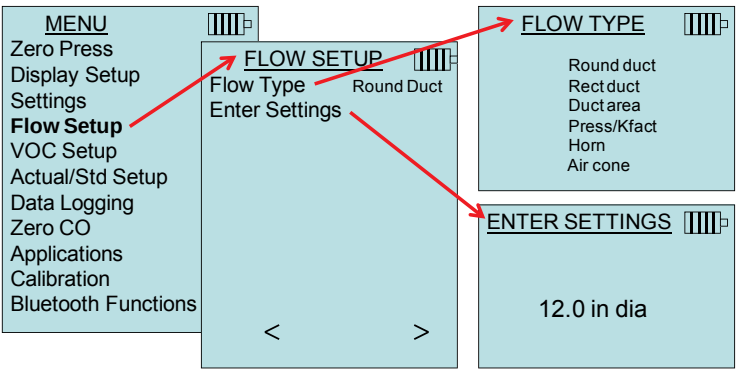
SETTINGS

Settings menu is where you can set the general settings. These include Language, Beeper, Select Units, Time Constant, Contrast, Set Time, Set Date, Time Format, Date Format, Number Format, Backlight and Auto Off. Use the ▲or ▼ keys to select an option, and the ◄ or ► soft keys to change the settings for each option. Press the ↵ key to accept settings.



FLOW SET UP

In **Flow Setup** mode, there are five types: Round Duct, Rectangle Duct, Duct Area, Horn and K-Factor. Use the ◄ or ► soft keys to scroll through the types and then press the ↵ key to accept the desired type. To change the value, highlight the **Enter Settings** option and press the ↵ key.



NOTE: *Press/Kfact allows for calculating flow rate from diffusers or flow stations with pressure taps using the instruments pressure ports and Kfactors. The Kfactors are obtained from the diffuser or flow station manufacturer. For more information, refer to Application Note TSI-114.*

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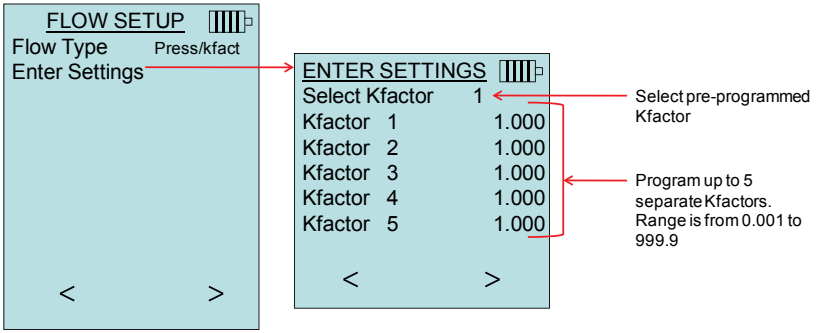
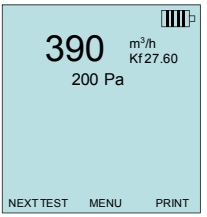


NOTE: *When measuring flow with a Kfactor, the value can be quickly changed by pressing the ▲ or ▼ key:*

1. *Set **Flow** to **PRIMARY** in **Display Setup** menu.*
2. *Press the ▲or ▼key to access Kfactor adjustment screen.*
3. *Make adjustments with arrow keys and press ↵ to accept.*



NOTES: *The horn numbers are the models of the horns. For example, 100 refers to a horn model number AM 100. Only horns with Model numbers as follows can be used with this function: AM 100, AM 300, AM 600 and AM 1200. If a horn model number is chosen, the instrument will return to measuring mode and use a preprogrammed curve to calculate flow rate from velocity when using a thermoanemometer probe.*

The air cone selection applies to the Model 995 Rotating Vane Anemometer and the Air Cone kit p/n 801749.

VOC SETUP

This menu item applies to TSI probes that measure Volatile Organic Compounds (VOC). The Response Factor and Molecular Weight of a specific gas can be inputted by the user.

- The response Factor is used to calculate the actual concentration of a specific VOC.
- The Molecular Weight of a specific gas allows for converting concentration (PPM or PPB) to mass concentration (mg/m^3).
- Reset Isobutylene will restore the factory to factory conditions for Isobutylene (56.11).

For more information, refer to Application Note TSI-147.

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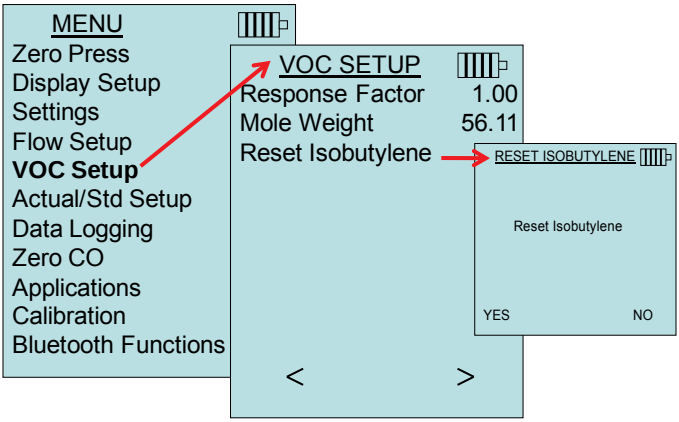
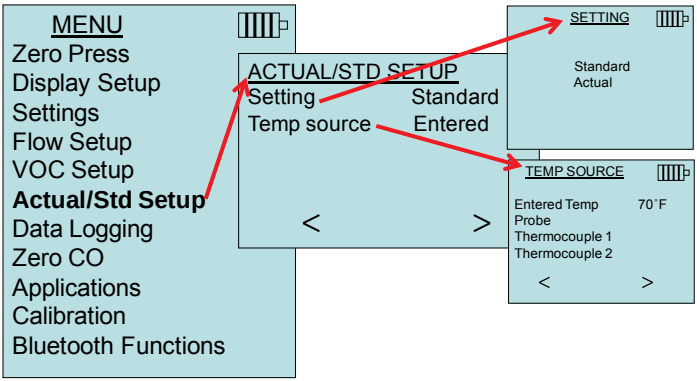


ACTUAL/STANDARD SETUP

Choose **Actual/Standard** measurements and parameters in the Act/Std Setup menu. The Model 9565 measures the actual barometric pressure using an internal sensor. The temperature source can be entered manually or taken from a probe that measures temperature (plug in probe or thermocouple).

For more information on Actual and Standard conditions, refer to Application Note TSI-109.



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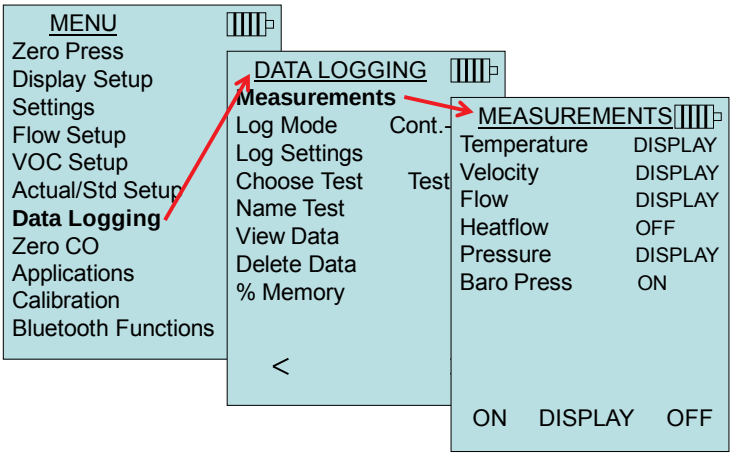
Measurements

Measurements to be logged to memory are independent of measurements on the display, and must therefore be selected under **DATA LOGGING → Measurements**.

- When set to **ON**, measurement will be logged to memory.
- When set to **DISPLAY**, measurement will be logged to memory if it is visible on the main running screen.
- When set to **OFF**, measurement will not be logged to memory.



NOTE: *Pitot Velocity and AFProbe Velocity cannot both be ON at the same time, nor can one be set to* ***PRIMARY*** *and the other to ON. Only one can be ON at any given time.*

Log Mode/Log Settings

The 9565 can be programmed to store measurements to memory in several different logging formats:

- Manual
- Auto-save
- Cont-key
- Cont-time
- Program 1
- Program 2

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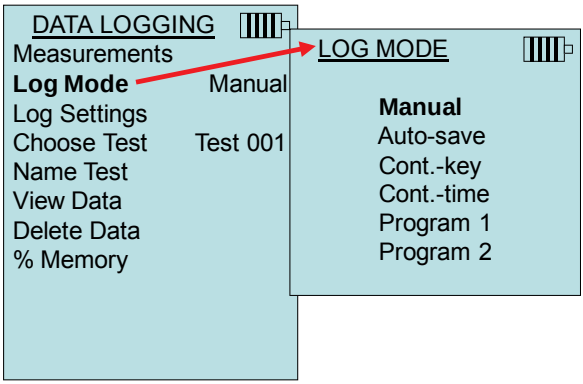
Manual Logging

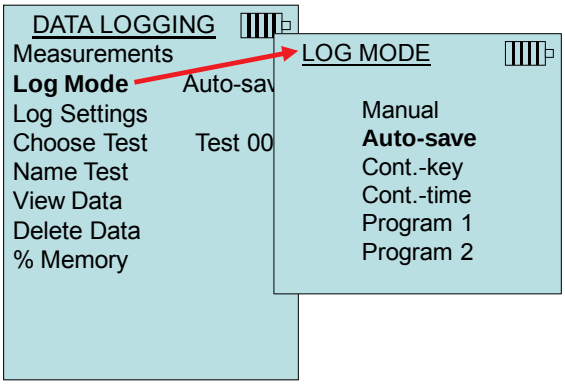
Manual mode does not automatically save data, but instead prompts the user to **SAVE** a sample or **ESC** to not save. To start logging, press the ↵ key.

***NOTE**: To adjust the averaging period for a sample, change the Time Constant (increase or decrease in seconds) which is located in the Settings Menu.*



Auto Save Logging

In **Auto-save** mode, the user samples are automatically logged to memory at the end of the sampling period. To start logging, press the ↵ key.



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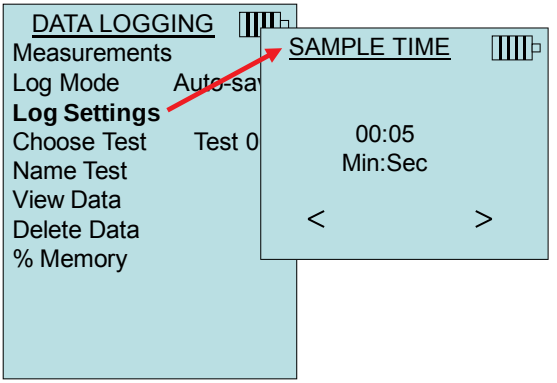
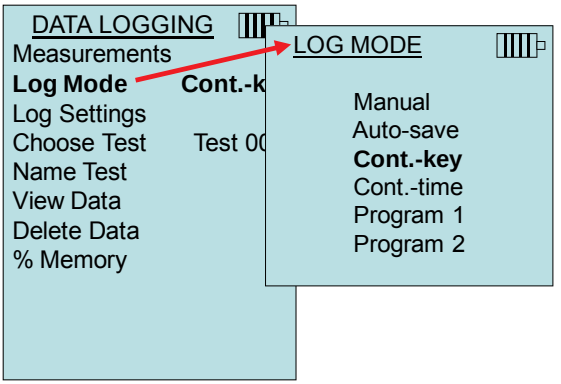
When set to **Auto-save**, the Sample Time can be adjusted. Sample Time is the time period over which the Sample will be averaged.



Cont-key Logging

In **Cont-key** mode, the user starts logging by pressing the ↵ key. The instrument will continue logging until the ↵ key is pressed again.



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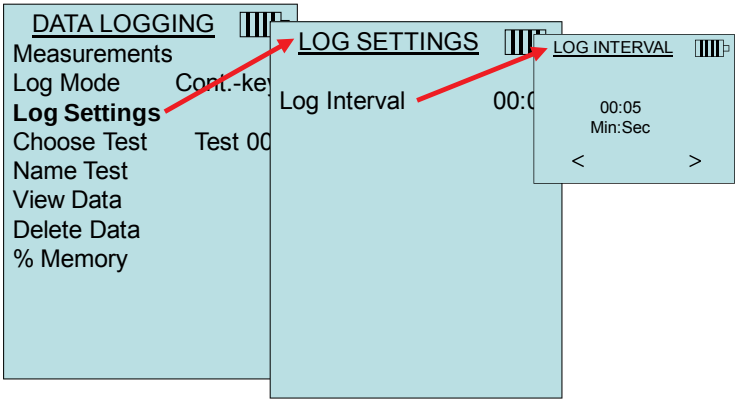
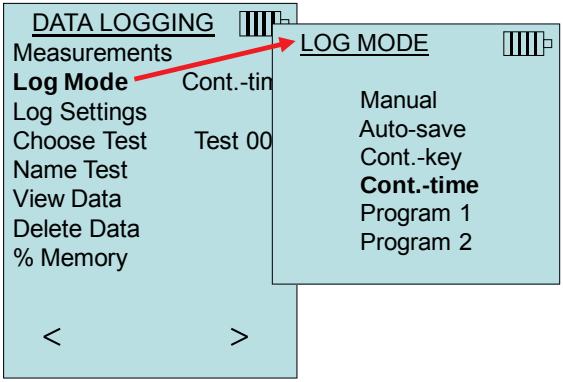
When set to **Cont. key**, the log interval can be adjusted.



***NOTE**: Pressing the ▲▼keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments during unattended logging. A "Lock" symbol will appear on the display. To unlock the keypad, press the ▲▼keys simultaneously. The "Lock" symbol will disappear.*

Cont-time Logging

In **Cont-time** mode, the user starts taking readings by pressing the ↵ key. The instrument will continue taking samples until the time as set in "Test Length" has elapsed.



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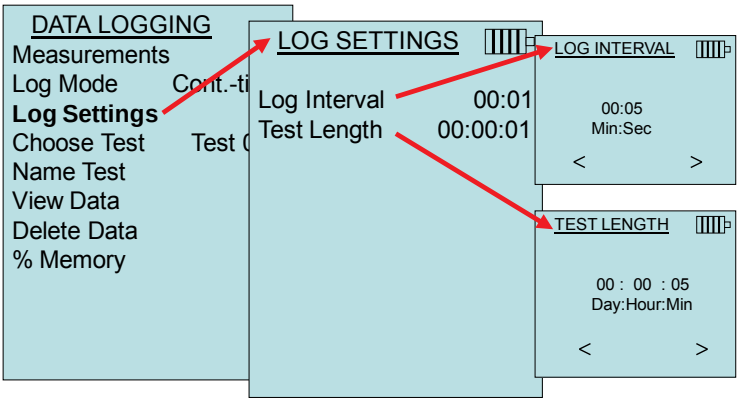
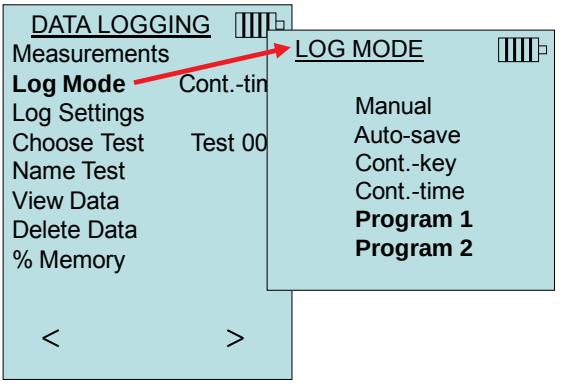
When set to **Cont.-time**, the log interval and test length can be adjusted.



***NOTE**: Pressing the ▲▼keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments during unattended logging. A "Lock" symbol will appear on the display. To unlock the keypad, press the ▲▼keys simultaneously. The "Lock" symbol will disappear.*

Program 1 and Program 2

Program 1 and **Program 2** are customized data logging setup programs. Setting them up is performed using TSI's TRAKPRO™ Data Analysis software.



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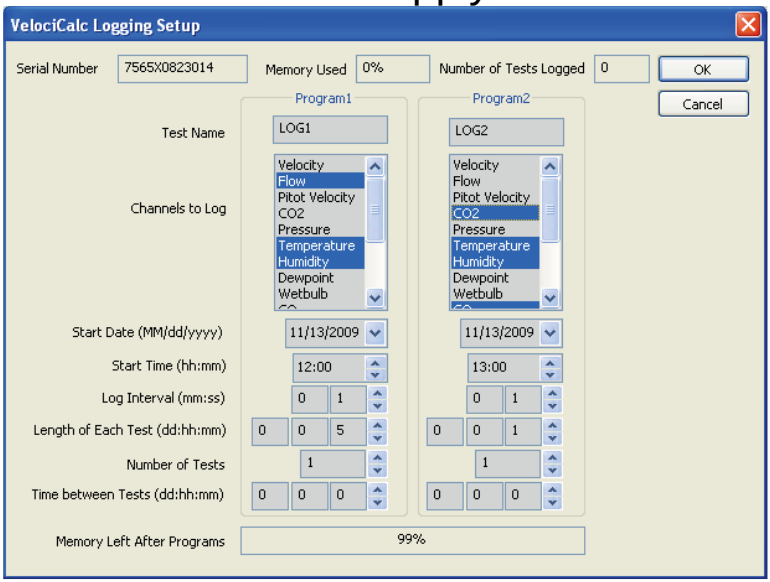

For more information, refer to the TRAKPRO Data Analysis Software User's Guide which can be found on the TRAKPRO software CD which is included with the 9565.

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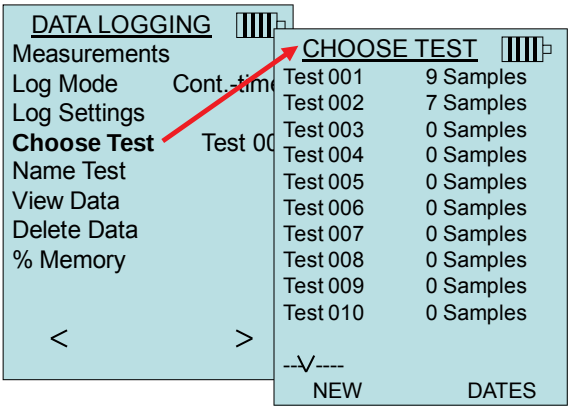
Choose Test

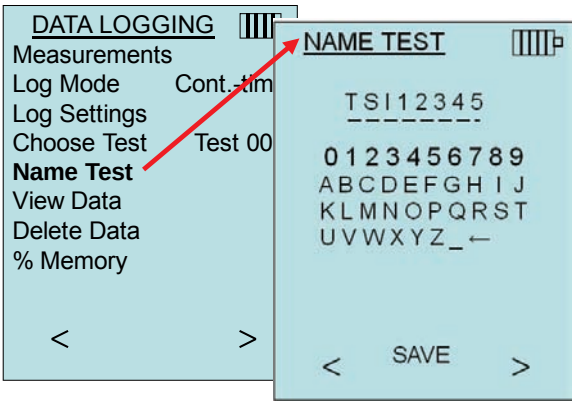
Test ID's consist of a group of Samples that are used to determine statistics (average, minimum, and maximum) of a measurement application**.** The 9565 can store 26,500+ samples and 100 test IDs (one sample can contain fourteen measurement types)**.** Example: Each duct traverse will have its own Test ID consisting of several Samples**.**

Pressing **NEW** will advance to the next available Test ID. Pressing **DATES** will list the date the Test was taken.



Name Test

This option allows for customizing the Test ID name using 8 characters maximum. Use the arrow keys to move the cursor to a desired location, press ↵ to accept. Repeat until the desired name appears. Press **SAVE** to store custom ID name.



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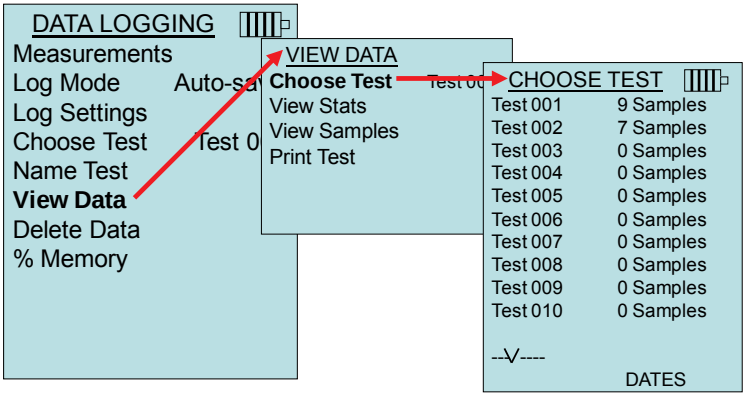
View Data

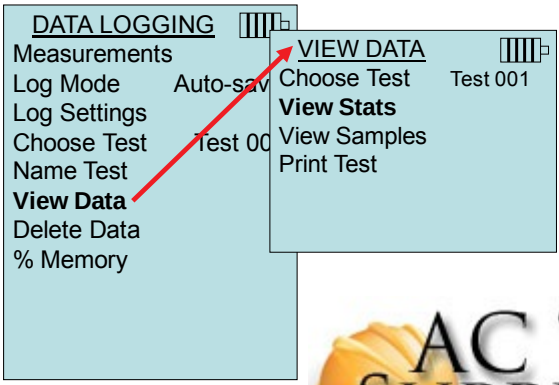
Choose Test

To view stored data, first select the Test ID that contains the data to be recalled. This is accomplished in the "**Choose Test**" menu.



View Stats

Displays statistics (average, minimum, and maximum) of a selected Test ID and the number of samples, date and time the samples were taken.



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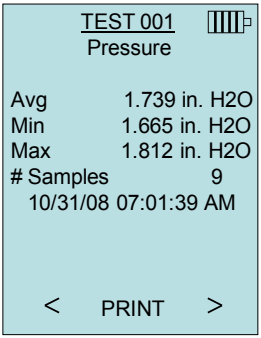
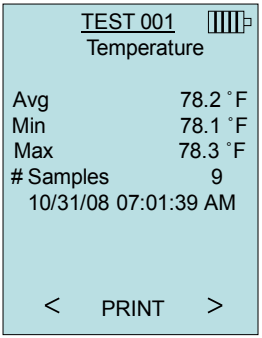
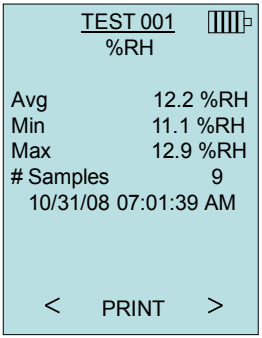
Use the ◄ and ► arrow keys to view statistics of all the measurement parameters stored in a Test ID.



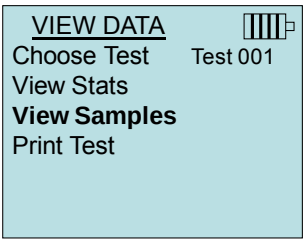




Example: TEST 001 has 9 samples, each sample consists of a pressure, temperature, and relative humidity reading. Use the < or > keys to view statistics of each measurement parameter.

The 9565 can send this data to the optional Model 8934 wireless printer or PC capable of Bluetooth communications. To use the **PRINT** command, Bluetooth communications must be established between the 9565 and the Model 8934 wireless printer or PC set up with Bluetooth communications.

View Samples



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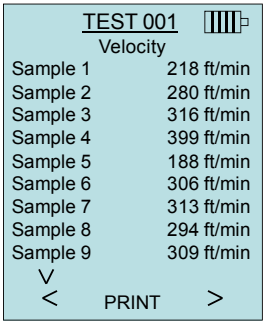
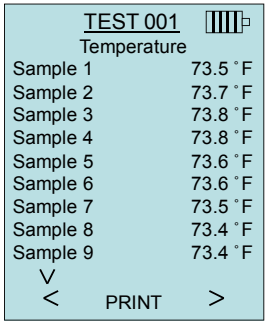
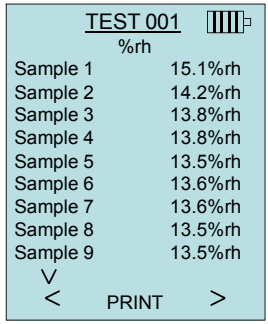
Use the ◄ and ► arrow keys to view samples of all the measurement parameters stored in a Test ID.



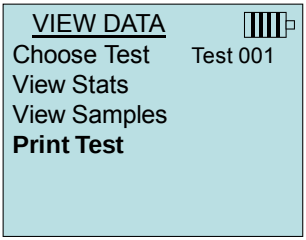




The 9565 can send this data to the optional Model 8934 wireless printer or PC capable of Bluetooth communications. To use the **PRINT** command, Bluetooth communications must be established between the 9565 and the Model 8934 wireless printer or PC set up with Bluetooth communications.

Print Test

Press ↵ to print all statistics and samples for the selected Test ID.



The 9565 can send this data to the optional Model 8934 wireless printer or PC capable of Bluetooth communications. To use the **PRINT** command, Bluetooth communications must be established between the 9565 and the Model 8934 wireless printer or PC set up with Bluetooth communications.

For more information on establishing Bluetooth connections, refer to TSI Applications Note TSI-150.

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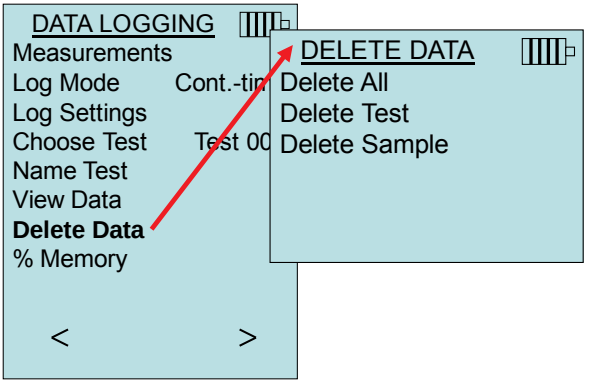
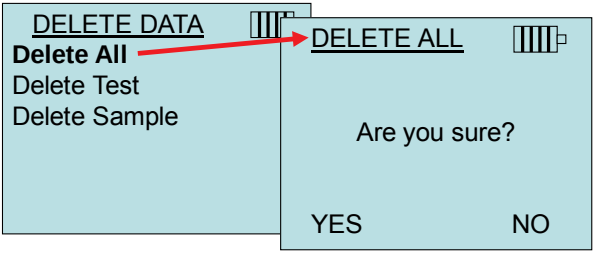
Delete Data

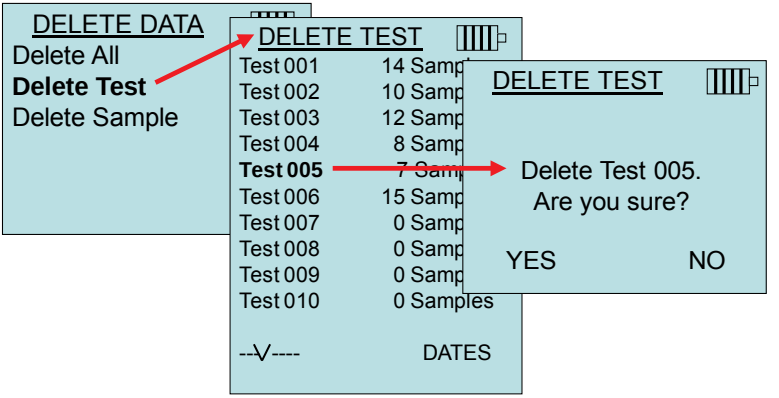
Use this to delete all data, delete test or delete sample.



Delete All will clear stored data in all Test IDs.



Delete Test will clear stored data in an individual Test ID selected by the user.



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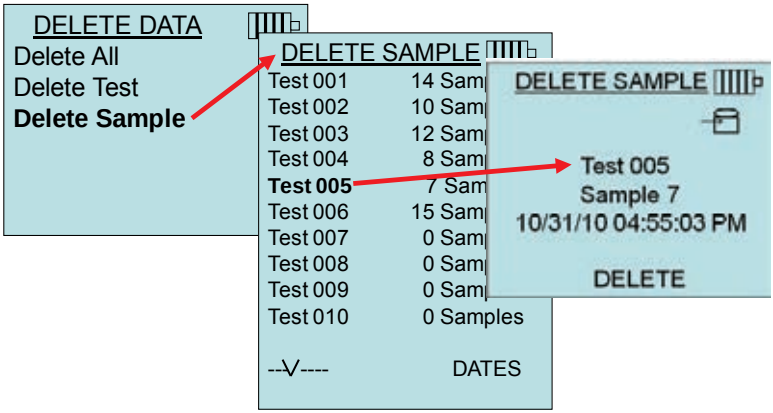
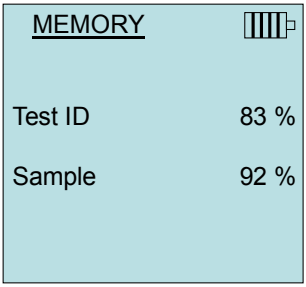
Delete Sample will clear the last sample in an individual Test ID selected by the user.



% Memory

This option displays the memory available. **Delete All**, under **Delete Data**, will clear memory and reset the memory available to 100%.



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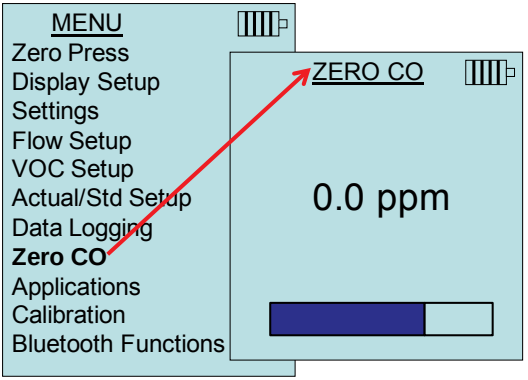
ZERO CO

This menu item applies to TSI probe Model 982 which can measure carbon monoxide (CO). Zero CO will zero the CO sensor readings that may have drifted. Initiating the Zero CO function will show the sensor CO reading and the time remaining.



***NOTE**: The Zero CO function should be performed in an area where no combustion is taking place which may affect zeroing of the sensor.*

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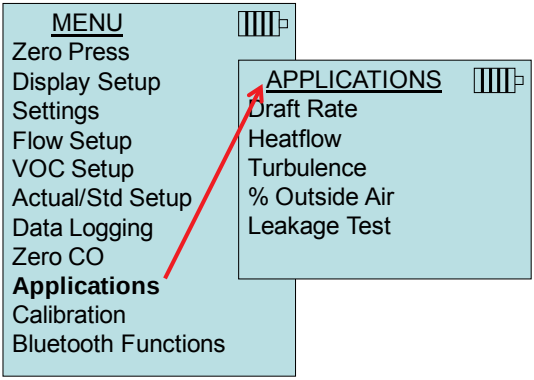
APPLICATIONS

This menu option includes specialized measurement protocols used to perform various tests or investigations. You can choose Draft Rate, Heat flow, Turbulence, % Outside Air, and Leakage Test in the Applications menu. For more information on these applications, refer to the following information:

- Draft Rate: Application Note TSI-142
- Heat Flow: Application Note TSI-124
- Turbulence Intensity: Application Note TSI-141
- Percent Outside Air: Application Note TSI-138
- Leakage Test: PANDA Manual



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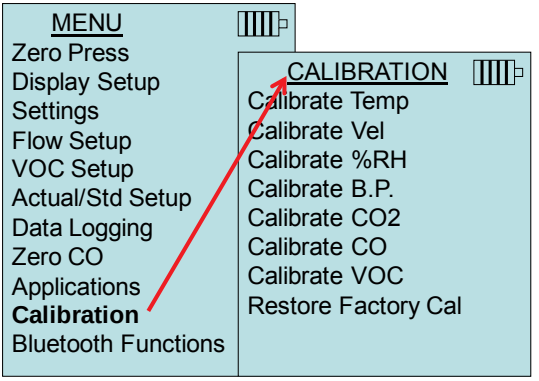
CALIBRATION

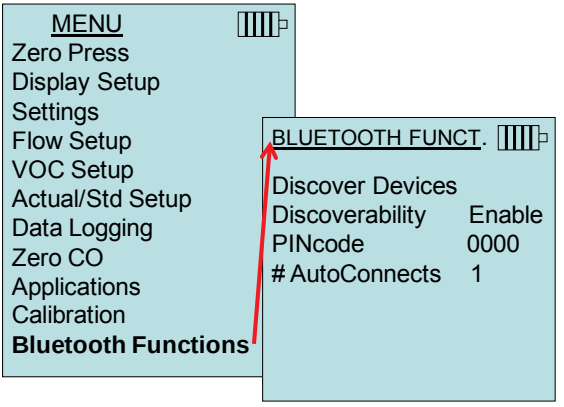
The Calibration Menu lists measurement parameters that can be adjusted in the field. The appropriate detachable probes must be attached to the 9565 before field calibration can be undertaken except for pressure and barometric pressure calibration.

For more information on performing field calibrations, refer to TSI Applications Note TSI-146.



BLUETOOTH FUNCTIONS

The VELOCICALC Model 9565 meter contains a Bluetooth Functions menu which is used to adjust parameters to assist with wireless connections to other Bluetooth capable devices.



Discover Devices

Start the Bluetooth process of finding other devices from the VELOCICALC Model 9565.

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Discoverability

Describes whether another device can discover the VELOCICALC Model 9565 meter. Options include:

Disable	The instrument is not discoverable by other devices.
Temporary	Allows the instrument to be discoverable until another device pairs with it or until the instrument power is turned off and back on.
Enable	Makes the instrument discoverable indefinitely.

PINcode

The PINcode is a security key to be entered into the computer if prompted. The factory default PINcode is **0000**.

NOTE: *PINcode must be set to **0000** in order to use 8934 printer.*

AutoConnects

Specifies how many times the instrument will attempt to reattach to a paired device after the power is turned on. For this option, the instrument Discoverability setting must be enabled. Settings are 0 to 5 times.

For more information on establishing Bluetooth connections, refer to TSI Applications Note TSI-150.

Printing Data Using the Portable Printer

To print logged data, first enter the DATALOGGING menu. Then, use the **CHOOSE TEST** item to select the data to be printed. After the test is selected, use the **VIEW STATS** and **VIEW SAMPLES** items to select statistics or individual data points to view and print. After selecting **VIEW STATS** or **VIEW SAMPLES**, press the **PRINT** key to print the data.

TRAKPRO™ Data Analysis Software

The VELOCICALC Model 9565 comes with special software called TRAKPRO™ Data Analysis Software, which is designed to provide you with maximum flexibility and power.

Follow the instructions on the label of the TRAKPRO software to install the software on your computer. TRAKPRO software contains a very comprehensive Help Function. This utility provides all the necessary information to guide you in all aspects of software operation. The software is

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shipped on a CD-ROM.

To download data from the Model 9565, connect the supplied computer interface USB cable to the Model 9565 and to a computer USB port. Any USB port can be used.

LogDat2™ Downloading Software

The VELOCICALC Model 9565 also includes downloading software called LogDat2. LogDat2 software transfers the stored data from the Model 9565 to a computer as a spreadsheet file. This software is useful for applications such as duct traverses, fume hood, and filter face velocity testing.

Follow the instructions on the label of the LogDat2 software to install the software on your computer. The software is shipped on a CD-ROM and includes a User's Guide and Installation Instructions.

To download data from the Model 9565, connect the supplied computer interface USB cable to the Model 9565 and to a computer USB port. Any USB port can be used.

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Chapter 5

Troubleshooting

Table 5-1 lists the symptoms, possible causes, and recommended solutions for common problems encountered with the Model 9565. If your symptom is not listed, or if none of the solutions solves your problem, please contact TSI.

Table 5-1: Troubleshooting the Model 9565

Symptom	Possible Causes	Corrective Action
No Display	Unit not turned on	Switch unit on.
	Low or dead batteries	Replace batteries or plug in AC adapter.
	Dirty battery contacts	Clean the battery contacts.
Velocity reading fluctuates unstable	Fluctuating flow	Reposition probe in less turbulent flow or use longer time constant.
No response to keypad	Keypad locked out	Unlock keypad by pressing ▲▼ keys simultaneously.
Instrument Error message appears	Memory is full	Download data if desired, then **DELETE ALL** memory.
	Fault in instrument	Factory service required on instrument.
Probe Error message appears	Fault in probe	Factory service required on probe.
Probe is plugged in, but the instrument does not recognize it	Probe was plugged in when the instrument was ON	Turn instrument OFF and then turn it back ON.

WARNING!
Remove the probe from excessive temperature immediately: excessive heat can damage the sensor. Operating temperature limits can be found in Appendix A, Specifications. The pressure sensor is protected from damage up to 7 psi (48 kPa or 360 mmHg). At higher pressure it can burst!

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Appendix A

Specifications

Specifications are subject to change without notice.

Velocity (TA Probe):

Range:	0 to 9999 ft/min (0 to 50 m/s)
Accuracy[1&2]:	±3% of reading or ±3 ft/min (±0.015 m/s), whichever is greater
Resolution:	1 ft/min (0.01 m/s)

Velocity (Pitot Tube):

Range[3]:	250 to 15500 ft/min (1.27 to 78.7 m/s)
Accuracy[4]:	±1.5% at 2000 ft/min (10.16 m/s)
Resolution:	1 ft/min (0.01 m/s)

Duct Size:

Range:	1 to 500 inches in increments of 0.1 in. (2.5 to 1270 cm in increments of 0.1 cm)

Volumetric Flow Rate:

Range:	Actual range is a function of actual velocity, pressure, duct size, and K factor

Temperature (TA Probe):

Range:	14 to 140°F (-10 to 60°C)
Accuracy[5]:	±0.5°F (±0.3°C)
Resolution:	0.1°F (0.1°C)

Relative Humidity (TA Probe):

Range:	5 to 95% RH
Accuracy[6]:	±3% RH
Resolution:	0.1% RH

Wet Bulb Temperature (TA Probe):

Range:	40 to 140°F (5 to 60°C)
Resolution:	0.1°F (0.1°C)

Dew Point (TA Probe):

Range:	5 to 120°F (-15 to 49°C)
Resolution:	0.1°F (0.1°C)

Heat Flow (TA Probe):

Range:	Function of velocity, temperature, humidity, and barometric pressure
Measurements available:	Sensible heat flow, latent heat flow, total heat flow and sensible heat factor
Units measured:	BTU/hr, kW

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Static / Differential Pressure:
Range[7]: -15 to +15 in. H_2O (-28.0 to +28.0 mm Hg, -3735 to +3735 Pa)
Accuracy: ±1% of reading ±0.005 in. H_2O (±1 Pa, ±0.01 mm Hg)
Resolution: 0.001 in. H_2O (0.1 Pa, 0.01 mm Hg)

Barometric Pressure:
Range: 20.36 to 36.648 in. Hg (517.15 to 930.87 mm Hg)
Accuracy: ±2% of reading

Instrument Temperature Range:
Operating (Electronics): 40 to 113°F (5 to 45°C)
Operating (Probe): 14 to 140°F (-10 to 60°C)
Storage: -4 to 140°F (-20 to 60°C)

Instrument Operating Conditions:
Altitude up to 4000 meters
Relative humidity up to 80% RH, non-condensing

Data Storage Capabilities:
Range: 26,500+ samples and 100 test IDs (one sample can contain fourteen measurement types)

Logging Interval:
Intervals: 1 second to 1 hour

Time Constant:
Intervals: User selectable

Response Time:
Velocity: 200 msec
Temperature: 2 minutes (to 66% of final value)
Pressure: 0.1 msec
Humidity: <1 minute (to 66% of final value)

External Meter Dimensions:
3.8 in. × 8.3 in. × 2.1 in. (9.7 cm × 21.1 cm × 5.3 cm)

Meter Probe Dimensions:
Probe length: 40 in. (101.6 cm)
Probe diameter of tip: 0.28 in. (7.0 mm)
Probe diameter of base: 0.51 in. (13.0 mm)

Articulating Probe Dimensions:
Articulating section length: 6.0 in. (15.24 cm)
Diameter of articulating knuckle: 0.38 in. (9.5 mm)

Meter Weight:
Weight with batteries: 0.8 lbs (0.36 kg)

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Power Requirements:

Four AA-size batteries (included) or
AC Adapter p/n 801761

Input: 90 to 240 VAC, 50 to 60 Hz
Output: 9 VDC, 2A

[1] Temperature compensated over an air temperature range of 40 to 150°F (5 to 65°C).

[2] The accuracy statement of ±3.0% of reading or ±3 ft/min (±0.015 m/s), whichever is greater, begins at 30 ft/min through 9999 ft/min (0.15 m/s through 50 m/s).

[3] Pressure velocity measurements are not recommended below 1000 ft/min (5 m/s) and are best suited to velocities over 2000 ft/min (10.00 m/s). Range can vary depending on barometric pressure.

[4] Accuracy is a function of converting pressure to velocity. Conversion accuracy improves when actual pressure values increase.

[5] Accuracy with instrument case at 77°F (25°C), add uncertainty of 0.05°F/°F (0.03°C/°C) for change in instrument temperature.

[6] Accuracy with probe at 77°F (25°C). Add uncertainty of 0.1% RH/°F (0.2% RH/°C) for change in probe temperature. Includes 1% hysteresis.

[7] Overpressure range = 190 in. H_2O (7 psi , 360 mmHg, 48 kPa).

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Appendix B

Optional Plug-in Probes

Thermoanemometer Probes	
Model	**Description**
960	Air Velocity and Temperature, Straight Probe
962	Air Velocity and Temperature, Articulating Probe
964	Air Velocity, Temperature, and Humidity, Straight Probe
966	Air Velocity, Temperature, and Humidity, Articulating Probe

Rotating Vane Anemometer Probes	
Model	**Description**
995	4 in. (100 mm) Rotating Vane, Air Velocity, and Temperature

Indoor Air Quality (IAQ) Probes	
Model	**Description**
980	Indoor Air Quality Probe, Temperature, Humidity, CO_2
982	Indoor Air Quality Probe, Temperature, Humidity, CO_2 and CO

Volatile Organic Compounds (VOC) Probes	
Model	**Description**
984	Low Concentration (ppb) VOC and Temperature
985	High Concentration (ppm) VOC and Temperature
986	Low Concentration (ppb) VOC, Temperature, CO_2, and Humidity
987	High Concentration (ppm) VOC, Temperature, CO_2, and Humidity

K-alloy Thermocouple Probes	
Model	**Description**
792	Surface Temperature Probe
794	Air Temperature Probe

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Pitot Probes	
Model	**Description**
634634000	Pitot Probe 12" (30 cm) - 5/16" (8 mm) diameter
634634001	Pitot Probe 18" (46 cm) - 5/16" (8 mm) diameter
634634002	Pitot Probe 24" (61 cm) - 5/16" (8 mm) diameter
634634003	Pitot Probe 36" (91 cm) - 5/16" (8 mm) diameter
634634005	Pitot Probe 60" (152 cm) - 5/16" (8 mm) diameter
634634004	Telescoping Pitot Probe - 8" to 38" (20 cm to 96 cm)
800187	Air Flow Probe (Straight Pitot) 18" (46 cm) - 5/16" (8 mm) diameter